implantation of a transvenous lead system. 2D echocardiography was therefore performed in 46 pts who underwent implantation of a transvenous lead system. Fifteen pts were excluded because of inadequate 2D images. *Results;*

	DFT (J) >25 (n = 22)	DFT (J) ≤25 (n = 9)	P
LV Volume (ml)	359 ± 72	263 ± 88	0.02
LV Mass (g)	229 ± 52	214 ± 51	NS
Posterior Wall Thickness (mm)	0.87 ± 0.19	0.94 ± 0.17	NS
Septal Thickness (mm)	1.64 ± 2.33	1.17 ± 1.32	NS
Enddiastolic LV Diameter (mm)	5.56 ± 1.96	6.14 ± 0.92	NS

In addition, age and LV ejection fraction were not significantly different between the 2 groups. All pts with DFT >25 J but only 28% of pts with DFT ≤25 J had an LV volume >275 ml ($P < 0.01$).

Conclusions; All pts with an LV volume <275 ml had acceptable DFTs. These results suggest that LV volume is an important determinant of successful defibrillation with transvenous lead systems since it may in part determine transmyocardial current density for a given defibrillation shock.

928 Electrocardiographic Patterns/Generation of Ventricular Tachycardia

Monday, March 20, 1995, 3:00 p.m.–5:00 p.m.
Ernest N. Morial Convention Center, Hall E
Presentation Hour: 3:00 p.m.–4:00 p.m.

928-76 "Crochetage" in the R Wave in Inferior Leads: A New Independant ECG Hallmark of Atrial Septal Defect (ASD) Related to Shunt Severity

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A rapid up and down motion ("crochetage") of the R ware in at least one inferior lead — involving the initial 30 to 70 msec of the QRS — is usually observed in pts with ostium secundum (OS) ASD, but its diagnostic value was not previously studied. Thus, we retrospectively tested the presence of a "crochetage" in 2 groups (Gr) of pts: Gr 1 (568 pts with OS ASD and QRS duration lesser than 120 msec); Gr 2 (459 pts with normal heart, matched for age with Gr 1). In Gr 1, an incomplete right bundle branch block (RBBB) was present in 522 pts, mean pulmonary artery pressure (PAP) and shunt severity (Qp/Qs) were assessed in all pts, and surgery was performed in 484 pts. *Results;* (1) In Gr 1, a "crochetage" was absent in 143 pts (Gr A, 27%), present in one inferior lead in 80 pts (Gr B, 15%) and in 2 to 3 leads in 309 pts (Gr C, 58%); (2) Sensitivity, specificity, accuracy and positive predictive value (PPV) of a "crochetage" pattern for an OS ASD reached 73%, 93%, 92% and 94%; comparatively, they reached 98%, 89%, 94% and 91% for a RBBB pattern; when associated to an incomplete RBBB, the PPV of a "crochetage" pattern reaches 96% if limited to one lead and 99.5% if present in 2 to 3 inferior leads; (2) In Gr 1, age and PAP were not different between Gr A, B or C; means Qp/Qs were 2.8 in Gr A, 3.6 in Gr B and 3.8 in Gr C ($p < 0.0001$); in pts with pulmonary hypertension (PAP > 30 mmHg), this pattern was present in 2/3 leads in 29% of cases if Qp/Qs < 1.5 vs 67% if Qp/Qs > 1.5 ($p < 0.02$); among pts operated on, this pattern was more frequent in case of larger defect ($p < 0.0001$); using multiple regression analysis, only Qp/Qs and defect size were significantly associated to this pattern ($p < 0.0001$); (4) After surgery, this pattern rapidly (<15 days) and frequently (37%) disappears while the RBBB pattern persists. *Conclusions;* A "crochetage" of the R ware in inferior leads is a new ECG hallmark of ASD related to shunt size but not to the RBBB or PAP. Associated to an incomplete RBBB, the PPV of this pattern for ASD reached almost 100%.

928-77 Right and Left Precordial QRS Duration Ratio in Arrhythmogenic Right Ventricular Dysplasia

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Prolongation of QRS duration in V2 of 110 msec or more seems to be a specific diagnostic parameter in arrhythmogenic right ventricular dysplasia (ARVD) with a sensitivity of 75%. In order to define a more common criterium with higher sensitivity QRS duration in a best available limb lead and in all precordial leads were analysed in 41 pts. with ARVD fulfilling major and minor diagnostic criteria and in 24 pts. with idiopathic right ventricular arrhythmia.

Localised right precordial prolongation of QRS duration could be achieved in 38 pts (93%) with a QRS duration ratio in V2/V4 and a ratio of the sum of right (V1–3) and left precordial (V4–6) QRS duration of >1.1; on the contrary, in all pts. with idiopathic right ventricular arrhythmia these ratios were <1.1 and not more than 1 in most cases.

QRS duration in V2 was 110 msec or more in 29 pts (76%) and 100–<110 msec in 9 pts. T wave inversions in V1–V3 could be found in 7 pts (18%) and in V1–>V3 in 18 pts (47%) in ARVD and in V4–V6 in 3 pts with idiopathic right ventricular arrhythmia.

Conclusions; Localised right precordial QRS prolongation is the ECG criterium of highest sensitivity (93%) and outstanding specifity (100%) in ARVD in a definition using QRS duration ratios of right and left precordial leads. With this criterium which cannot be found in idiopathic right ventricular arrhythmia conventional ECG contributes significantly in the clinical definition of ARVD.

928-78 Electrocardiographic Identification of Left Ventricular Hypertrophy: Test Performance and Variability in Relation to Definition of Hypertrophy

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Test performance of the ECG for the detection of left ventricular hypertrophy (LVH) will vary with the ECG criteria used, but may also vary with how LVH is defined. LVH has been most commonly defined echocardiographically using LV mass indexed to body surface area (LVH-BSA), but LVH has also been defined using LV mass indexed to height (LVH-HT), and more recently, to the 2.7 power of height (LVH-27). To assess the relationship of test performance of ECG criteria to the definition of LVH, simple Cornell voltage criteria, the product of QRS duration and Cornell voltage (the Cornell product), and the Framingham adjusted Cornell voltage (using gender-specific regression equations incorporating age and body mass index) were examined in 212 patients. Sensitivity of each criterion for each definition of LVH was compared at matched specificity of 95%:

Criteria	Cornell Voltage	p	Adjusted Cornell	p	Cornell Product	p vs Cornell Voltage
LVH-BSA	45%	**	24%	**	52%	*
LVH-HT	35%	ns	33%	ns	43%	*
LVH-27	36%	ns	29%	*	39%	ns

*$p < 0.05$, **$p < 0.001$

Comparison of overall performance using receiver operating characteristic curves confirmed the superior overall performance of the Cornell product relative to adjusted Cornell voltage for LVH-BSA and LVH-27. Further, the coefficient of variability of overall performance as a function of LVH definition was greater for adjusted Cornell voltage (5.8%) than for the Cornell product (1.5%). These data demonstrate that performance of ECG criteria for LVH will vary with the definition of LVH and suggest that the Cornell product provides the best overall accuracy and least variability between LVH definitions. These findings have important implications for the use of both ECG and echocardiographic criteria for LVH in epidemiologic studies.

928-79 Electrocardiographic Criteria for Left Ventricular Hypertrophy in Black Population

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The electrocardiographic (ECG) criteria for left ventricular hypertrophy (LVH) i.e., Romhilt-Estes (RE) score, Sokolow and Lyon (SL) and Cornell (C) have poor sensitivity in blacks necessitating the development of race-specific ECG criteria for LVH. Therefore, we studied 225 consecutive black patients (pts) requiring echocardiograms in order to develop a race-specific ECG criteria for LVH. Eighty ECG variables were tested. LVH was defined by left ventricular mass index (LVMI) ≥131 g/m^2 in men or ≥110 g/m^2 in women. There were equal number of men and women with a mean age of 57.6 ± 15.4. Using univariate and multivariate analysis, four ECG variables and their cut-off points (i.e., amplitude of R wave in L_3 ≥0.2 mV, amplitude of S wave in V_3 ≥ 1.5 mV, ST depression in V_6 ≥0.1 mV, negative P wave in V_1 ≥0.1 mV) were identified that best fit the model for LVH. A 14 point score system was derived using the beta coefficient for each of the categorical variables. Comparison with established criteria was as follows:

	HC	RE	SL	C
Sen/Spec	49/86	33/90	25/86	27/91
PPV/NPV	62/44	69/65	56/62	68/64

HC-Harlem Criteria, PPV-Positive Predictive Value, NPV-Negative Predictive Value.

We conclude that race-specific ECG criteria does not improve beyond established ECG standards for LVH detection. These data confirm that the ECG remains a poor screening tool for LVH in blacks.